

PATENT ABSTRACTS OF JAPAN

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(54) RECEIVING SYSTEM FOR MOBILE COMMUNICATION

(57)Abstract:

PROBLEM TO BE SOLVED: To find the existence of an illegal mobile communication terminal equipment illegally obtaining an authentication key at an early stage by authenticate-processing all the call-incoming responses received within a fixed time to one call-incoming request.

SOLUTION: A network receives the call-incoming response to this call-incoming request under starting a timer T (S6). When the timer T becomes a term, the reception of call-incoming responses is finished to start the authenticate-processing of the received call incoming responses. It is confirmed whether the number N of authentication confirmations is 0 or not (S18) and when the number N is not 0, whether N is 1 or not is confirmed next (S20). When the number N is not 1, as plural terminals judge the authentication confirming,

the number of the authentication confirmed and illegally used terminal is stored (S22). The stored terminal number and positional information of a terminal with the terminal number are reported to a control service facility. Thereby at the time of the call incoming of an illegal terminal pretending to be a legal mobile communication terminal equipment, its existence can be confirmed.

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CLAIMS

[Claim(s)]

[Claim 1] Arrival-of-the-mail demands are performed all at once to two or more base stations which call all at once and exist in area with the mobile communication system which has the authentication function of a mobile communication terminal. The arrival-of-the-mail response reception from two or more mobile communications base stations which call all at once and are held in area is fixed-time-amount (arrival-of-the-mail-response-registration-time amount of system construction)-inner-permitted. In the mobile communications arrival method which determines the object base station which should make arrival-of-the-mail connection after checking a just terminal with the authentication procedure between two or more mobile communication terminals with an arrival-of-the-mail response When the arbitration of the above-mentioned mobile communication system calls all at once, an arrival-of-the-mail demand occurs to area and an arrival-of-the-mail response is in fixed time amount from two or more mobile communication terminals to the demand The mobile communications arrival method characterized by enabling the check of use of the unjust terminal which uses the authentication key which carried out unjust acquisition by performing authentication processing to all arrival-of-the-mail responses that received the response.

[Claim 2] The arbitration of mobile communication system calls all at once, and an arrival-of-the-mail demand occurs to area. When an arrival-of-the-mail response is in fixed time amount from two or more mobile communication terminals to the demand and authentication of two or more terminals is checked in the authentication procedure to each arrival-of-the-mail response Said mobile communication system is a mobile communications arrival method according to claim 1 characterized by preventing the unauthorized use by memorizing the terminal number of the mobile communication terminal by which the authentication check was carried out, and refusing the arrival

addressed to this terminal number henceforth.

[Claim 3] The arbitration of mobile communication system calls all at once, and an arrival-of-the-mail demand occurs to area. When an arrival-of-the-mail response is in fixed time amount from two or more mobile communication terminals to the demand and authentication of two or more terminals is checked in the authentication procedure to each arrival-of-the-mail response Mobile communication system is a mobile communications arrival method according to claim 1 characterized by preventing the unauthorized use by refusing the dispatch from a mobile communication terminal which memorizes the terminal number of the mobile communication terminal by which the authentication check was carried out, and has this terminal number henceforth.

[Claim 4] The arbitration of mobile communication system calls all at once, and an arrival-of-the-mail demand occurs to area. When an arrival-of-the-mail response is in fixed time amount from two or more mobile communication terminals to the demand and authentication of two or more terminals is checked in the authentication procedure to each arrival-of-the-mail response Mobile communication system is a mobile communications arrival method characterized by preventing the unauthorized use by memorizing the terminal number of the mobile communication terminal by which the authentication check was carried out, and the mobile communication terminal which has this terminal number henceforth refusing to update positional information in other communications areas.

[Claim 5] The arbitration of mobile communication system calls all at once, and an arrival-of-the-mail demand occurs to area. When an arrival-of-the-mail response is in fixed time amount from two or more mobile communication terminals to the demand and authentication of two or more terminals is checked in the authentication procedure to each arrival-of-the-mail response Mobile communication system is a mobile communications arrival method according to claim 1 characterized by judging that unjust use of the terminal number of the mobile communication terminal by which the authentication check was carried out is carried out, and notifying a management service engine in charge etc. of the terminal number and positional information of this mobile communication terminal automatically.

[Claim 6] By the public digital network which holds two or more PHS (Personal Handy-phone System) base stations The arrival-of-the-mail demands to a PHS terminal are performed all at once to two or more base stations for the public which call all at once

and exist in area. The arrival-of-the-mail response reception from two or more base stations for the public which call all at once and are held in area is fixed-time-amount (arrival-of-the-mail-response-registration-time amount of system construction)-inner-permitted. In the mobile communications arrival method which determines the base station for the candidate public which should make arrival-of-the-mail connection after checking a just terminal with the authentication procedure between two or more PHS terminals When the arbitration in the above-mentioned public PHS service calls all at once, an arrival-of-the-mail demand occurs to area and an arrival-of-the-mail response is in fixed time amount from two or more PHS terminals to the demand The mobile communications arrival method characterized by enabling the check of use of the unjust terminal which uses the authentication key which carried out unjust acquisition by performing authentication processing to all arrival-of-the-mail responses that received the response.

[Claim 7] The arbitration in public PHS service calls all at once, and an arrival-of-the-mail demand occurs to area. When an arrival-of-the-mail response is in fixed time amount from two or more PHS terminals to the demand and authentication of two or more PHS terminals is checked in the authentication procedure to each arrival-of-the-mail response The public digital network which manages the positional information of a PHS terminal etc. is a mobile communications arrival method according to claim 6 characterized by preventing the unauthorized use by memorizing the terminal number of this PHS terminal and refusing the arrival addressed to this terminal number henceforth.

[Claim 8] The arbitration in public PHS service calls all at once, and an arrival-of-the-mail demand occurs to area. When an arrival-of-the-mail response is in fixed time amount from two or more PHS terminals to the demand and authentication of two or more PHS terminals is checked in the authentication procedure to each arrival-of-the-mail response The public digital network which manages the positional information of a PHS terminal etc. is a mobile communications arrival method according to claim 6 characterized by preventing the unauthorized use by memorizing the terminal number of this PHS terminal and refusing the dispatch from this terminal number henceforth.

[Claim 9] The arbitration in public PHS service calls all at once, and an arrival-of-the-mail demand occurs to area. When an arrival-of-the-mail response is in

fixed time amount from two or more PHS terminals to the demand and authentication of two or more PHS terminals is checked in the authentication procedure to each arrival-of-the-mail response The public digital network which manages the positional information of a PHS terminal etc. is a mobile communications arrival method according to claim 6 characterized by preventing the unauthorized use by this PHS terminal refusing to memorize the terminal number of this PHS terminal and to update positional information in other communications areas.

[Claim 10] The arbitration in public PHS service calls all at once, and an arrival-of-the-mail demand occurs to area. When an arrival-of-the-mail response is in fixed time amount from two or more PHS terminals to the demand and authentication of two or more PHS terminals is checked in the authentication procedure to each arrival-of-the-mail response The public digital network which manages the positional information of a PHS terminal etc. is a mobile communications arrival method according to claim 6 characterized by judging that unjust use of the terminal number of this PHS terminal is carried out, and notifying a management service engine in charge etc. of the terminal number and positional information of this PHS terminal automatically.

[Claim 11] By the digital cordless system for places of business which consists of two or more digital cordless base stations and a mobile station, and PBX that holds it, and has the authentication function of a mobile station The arrival-of-the-mail demands to a mobile station are performed all at once to two or more base stations which call all at once and exist in area. The arrival-of-the-mail response reception from two or more base stations which call all at once and are held in area is fixed-time-amount (arrival-of-the-mail-response-registration-time amount of system construction)-inner-permitted. In the mobile communications arrival method which determines the object base station which should make arrival-of-the-mail connection after checking a just terminal with the authentication procedure between two or more mobile stations The arbitration in the above-mentioned digital cordless system for places of business calls all at once, and an arrival-of-the-mail demand occurs to area. The mobile communications arrival method carry out enabling the check of use of the unjust terminal which uses the authentication key which carried out unjust acquisition by performing authentication processing to all arrival-of-the-mail responses that received the response when an arrival-of-the-mail response is in fixed time amount from two or more mobile stations to the demand as the description.

[Claim 12] The arbitration in the digital cordless system for places of business calls all at once, and an arrival-of-the-mail demand occurs to area. When an arrival-of-the-mail response is in fixed time amount from two or more mobile stations to the demand and authentication of two or more mobile stations is checked in the authentication procedure to each arrival-of-the-mail response A place-of-business digital cordless system is a mobile communications arrival method according to claim 11 characterized by preventing the unauthorized use by memorizing the terminal number of this mobile station and refusing the arrival addressed to this terminal number henceforth.

[Claim 13] The arbitration in the digital cordless system for places of business calls all at once, and an arrival-of-the-mail demand occurs to area. When an arrival-of-the-mail response is in fixed time amount from two or more mobile stations to the demand and authentication of two or more mobile stations is checked in the authentication procedure to each arrival-of-the-mail response A place-of-business digital cordless system is a mobile communications arrival method according to claim 11 characterized by preventing the unauthorized use by refusing the dispatch from a mobile station which memorizes the terminal number of this mobile station and has this terminal number henceforth.

[Claim 14] The arbitration in the digital cordless system for places of business calls all at once, and an arrival-of-the-mail demand occurs to area. When an arrival-of-the-mail response is in fixed time amount from two or more mobile stations to the demand and authentication of two or more mobile stations is checked in the authentication procedure to each arrival-of-the-mail response A place-of-business digital cordless system is a mobile communications arrival method according to claim 11 characterized by preventing the unauthorized use by this mobile station refusing to memorize the terminal number of this mobile station and to update positional information in other communications areas.

[Claim 15] The arbitration in the digital cordless system for places of business calls all at once, and an arrival-of-the-mail demand occurs to area. When an arrival-of-the-mail response is in fixed time amount from two or more mobile stations to the demand and authentication of two or more mobile stations is checked in the authentication procedure to each arrival-of-the-mail response A place-of-business digital cordless system is a mobile communications arrival method according to claim 11 characterized by judging that unjust use of the terminal number of this mobile station is carried out, and notifying a system administrator etc. of the terminal number and positional information of this mobile station automatically.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the mobile communications arrival method which permits the arrival-of-the-mail response from two or more mobile communications base stations which are called all at once and received in a certain fixed time amount to one arrival-of-the-mail demand to area about a mobile communications arrival method in the mobile communication network which give an arrival-of-the-mail demand to a detail all at once to two or more mobile communications base station groups (calling all at once area) more.

[0002]

[Description of the Prior Art] the positional information of the PHS terminal beforehand registered within the net in the public PHS service under current service at the time of the arrival to a PHS terminal -- being based -- the base station (base station group) of plurality [network] -- that is, it calls all at once and arrival-of-the-mail demands are performed all at once to area. A network is chosen as an object base station of arrival-of-the-mail connection of the base station which received the arrival-of-the-mail response early most, and the PHS terminal and authentication processing which the base

station subordinate has are performed. Therefore, the PHS terminal which carried out the arrival-of-the-mail response first carries out unjust acquisition of the authentication key of other PHS terminals which should receive a message essentially with a certain means, and it will be taken for an inaccurate PHS terminal being a just terminal in authentication processing when it is the inaccurate PHS terminal which turned into other PHS terminals and was being cleared up.

[0003] The flow chart which shows the above-mentioned communication link arrival method to drawing 2 explains. First, if it calls all at once and an arrival-of-the-mail demand of on a non-talk state (step S101... an expression called a step is omitted and it is only hereafter written as S) and as opposed to this PHS terminal by which calls all at once and location registration is carried out into area in area occurs (S102), an arrival-of-the-mail demand will be transmitted to all the base stations for the public that call a network all at once and exist in area (S103). A network will perform authentication processing between the PHS terminals which received the arrival-of-the-mail response, if the arrival-of-the-mail response to this arrival-of-the-mail demand is received (S104) (S105). When the authentication check of said PHS terminal is not able to be taken as a result of authentication processing of S105, cutting processing is performed to this PHS terminal unit (S106), cutting processing is further performed to this arrival-of-the-mail demand, and it returns to S(S107) 101. Moreover, when an authentication check is carried out to said PHS terminal as a result of authentication processing of S105, cutting processing is performed to all the links in the phase where the arrival-of-the-mail response is received at this time (S108), and connection processing is performed between said PHS terminals with which authentication was checked (S109).

[0004] When according to such an arrival-of-the-mail method it calls all at once, both unjust terminals which carried out unjust acquisition of the authentication key to area, became a just terminal to the just terminal at it, and was cleared up exist and an unjust terminal performs an arrival-of-the-mail response earlier than a just terminal, authentication processing is performed only between unjust terminals and existence of an unjust terminal cannot be checked with a network. Moreover, apart from the arrival-of-the-mail method of the public PHS service under current service, call all at once and the arrival-of-the-mail demand to area is received. Call all at once and fixed time amount permission of the signal reception of the arrival-of-the-mail response from a communication link base station to two or more ***** in area is carried out.

Authentication processing is performed to two or more ***** between communication terminals, and after checking authentication, arrival-of-the-mail response two or more permission method which determines the object base station which should make arrival-of-the-mail connection is considered for the purpose of communication link anti-jamming by the unjust terminal without a right authentication key. By adopting said arrival-of-the-mail response two or more permission method as mobile communication system, it becomes possible in mobile communication system to prevent jamming of the normal terminal by unjust terminal use.

[0005] The example which applied the above-mentioned arrival-of-the-mail response two or more permission method to public PHS service is shown in drawing 3 , and this is explained below. First, if it calls all at once and an arrival-of-the-mail demand of on a non-talk state (S111) and as opposed to this PHS terminal by which calls all at once and location registration is carried out into area in area occurs (S112), a network will transmit an arrival-of-the-mail demand to all the base stations for the public that call all at once and exist in area (S113), and will start the timer T for measuring arrival-of-the-mail response registration time amount (S114). If the arrival-of-the-mail response to this arrival-of-the-mail demand is received during timer T starting (S116), several n arrival-of-the-mail response reception will be incremented one time, a network associates n and a base station with an arrival-of-the-mail response, and it will memorize (however (S117), initial value of the several n arrival-of-the-mail response reception in S111 0), and it will wait the next arrival-of-the-mail response reception at S115. If Timer T expires in S115, authentication processing of the arrival-of-the-mail response which ended reception of an arrival-of-the-mail response, and was received will be started. It checks whether whether there having been any arrival-of-the-mail response reception first and several n arrival-of-the-mail response reception are 0 (S118). In S118, there is no arrival-of-the-mail response reception, and when n is 0, cutting processing is performed to this arrival-of-the-mail demand (S119), and it returns to S1.

[0006] Moreover, in S118, arrival-of-the-mail response reception is accepted, and when several n arrival-of-the-mail response reception is values other than zero, authentication processing to the PHS terminal of the base station subordinate who had the value of the authentication number of processing m (however, initial value of the authentication number of processing m in S111 1) associated is performed (S120). When the authentication check of said PHS terminal is not able to be taken as a result of

authentication processing of S120, cutting processing is performed to this PHS terminal (S121). Then, the comparison of the authentication number of processing m and several n arrival-of-the-mail response reception is performed (S122), if the value of m and n is in agreement, it will judge that there is nothing in the arrival-of-the-mail response which should be carried out authentication processing to others, and reset (S123) and the authentication number of processing m are carried out to 1 of initial value in several n arrival-of-the-mail response reception (S124), cutting processing is carried out to this arrival-of-the-mail demand (S119), and it returns to S111. It judges that the PHS terminal which has not carried out authentication processing yet will remain in others if m is smaller than n as a result of the comparison of the authentication number of processing m of S122, and several n arrival-of-the-mail response reception, the authentication number of processing m is incremented one time, and it returns to S(S125) 120. moreover, when an authentication check is carried out to said PHS terminal as a result of authentication processing of S120 At this time, cutting processing is performed to all the links in the phase where the arrival-of-the-mail response is received (S126). After setting arrival-of-the-mail response several n reception reset (S127) and the authentication number of processing m to 1 of initial value (S128), connection processing is performed between said PHS terminals with which authentication was checked (S129). [0007] In addition, although it is to return after [S111] cutting processing to an arrival-of-the-mail demand when a several n arrival-of-the-mail response is 0 in S118 in the above-mentioned arrival-of-the-mail method, as for a network, an arrival-of-the-mail demand is transmitted again in fact. Here, in order to make a flow chart intelligible, arrival-of-the-mail demand resending is not described. In the above-mentioned arrival-of-the-mail method, existence of the mobile communication terminal which uses the authentication key which carried out unjust acquisition cannot be discovered.

[0008]

[Problem(s) to be Solved by the Invention] As mentioned above, since only one permits the response to one arrival, the public PHS service under current service cannot detect arrival of the unjust terminal which carried out unjust acquisition of the authentication key from the normal terminal. In moreover, the authentication procedure between two or more mobile communication terminals which permitted the arrival-of-the-mail response reception from two or more sets ground offices which call all at once, call all at once to

one arrival-of-the-mail demand to area, and exist in area, and had the arrival-of-the-mail response Also in the mobile communication system which adopts arrival-of-the-mail response two or more permission method which determines the object base station which should make arrival-of-the-mail connection after checking authentication of a mobile communication terminal If authentication processing between the mobile communication terminals corresponding to the arrival-of-the-mail response received in fixed time amount is performed one by one and authentication is checked, in order to perform connection processing to the terminal which released all other links at the time, and was able to take the authentication check, The arrival of the unjust terminal which carried out unjust acquisition of the authentication key from the normal terminal too is undetectable. This invention is made in view of the above-mentioned point, discovers existence of the inaccurate mobile communication terminal which carried out unjust acquisition of the authentication key at an early stage, and aims at offering the mobile communications arrival method which can prevent the use beforehand.

[0009]

[Means for Solving the Problem] In order to solve an above-mentioned technical problem, in mobile communication system, such as public PHS service and a digital cordless system for places of business, mobile communication system has a means to perform authentication processing to all arrival-of-the-mail responses received in fixed time amount, by the mobile communications arrival method of this invention. Moreover, a means to memorize the terminal number in the mobile communication system of mobile communications arrival method application of this invention when authentication is checked by coincidence in further two or more terminals, Or it has a means to notify a management service engine etc. of the terminal number, positional information, etc., a means to refuse the arrival addressed to the memorized terminal number, or a means to refuse the dispatch and location registration from the terminal which has the memorized terminal number. The mobile communication system of mobile communications arrival method application of this invention permits the reception of the arrival-of-the-mail response from two or more base stations which receives in fixed time amount to one arrival-of-the-mail demand. This mobile communication system becomes possible [checking existence of the terminal which is going to carry out unjust acquisition of the authentication key, and is going to use it], when authentication is checked to two or more terminals by performing authentication processing to all arrival-of-the-mail responses

received in fixed time amount. Moreover, when authentication of two or more terminals is checked to one arrival, use of the terminal which has a terminal number with the possibility of unjust terminal use can be suspended by refusing the arrival addressed to this terminal number, the dispatch from the terminal which has this terminal number, and location registration. Furthermore, it judges that the unjust terminal is used when authentication of two or more terminals is checked to one arrival, and since it has a means to notify a management service engine of the positional information in which the terminal which has the possible terminal number and this terminal number of unjust terminal use is located automatically, it becomes possible to take original correspondence at an early stage for every management service engine.

[0010]

[Embodiment of the Invention] Below, the mobile communications arrival method of this invention is explained. Drawing 1 is a flow chart for explaining actuation of claim 1, claim 6, and the mobile communication system according to claim 11 that carried out mobile communications arrival method application. In the following explanation, the arrival-of-the-mail method in one simultaneous call area is explained by making the migration communication mode by public PHS service into the example of representation. First, if it calls all at once and an arrival-of-the-mail demand of on a non-talk state (S1) and as opposed to this PHS terminal by which calls all at once and location registration is carried out into area in area occurs (S2), a network will transmit an arrival-of-the-mail demand to all the base stations for the public that call all at once and exist in area (S3), and will start the timer T for measuring arrival-of-the-mail response registration time amount (S4). If the arrival-of-the-mail response to this arrival-of-the-mail demand is received during timer T starting (S6), several n arrival-of-the-mail response reception will be incremented one time, a network associates n and a base station with an arrival-of-the-mail response, and it will memorize (however (S7), initial value of the several n arrival-of-the-mail response reception in S1 0), and it will wait the next arrival-of-the-mail response reception at S5.

[0011] If Timer T expires in S5, authentication processing of the arrival-of-the-mail response which ended reception of an arrival-of-the-mail response, and was received will be started. First, it checks whether whether there having been any arrival-of-the-mail response reception and several n arrival-of-the-mail response reception are 0 (S8). In S8, there is no arrival-of-the-mail response reception, and when n is 0, cutting processing is

performed to this arrival-of-the-mail demand, and it returns to (S9) S1. Moreover, in S8, arrival-of-the-mail response reception is accepted, and when several n arrival-of-the-mail response reception is values other than zero, authentication processing to the PHS terminal of the base station subordinate who had the value of the authentication number of processing m (however, initial value of the authentication number of processing m in S1 1) associated is performed (S10). When the authentication check of said PHS terminal is not able to be taken as a result of authentication processing of S10, cutting processing is performed to this PHS terminal (S11). Then, the comparison of the authentication number of processing m and several n arrival-of-the-mail response reception is performed (S14). Moreover, when an authentication check is carried out to said PHS terminal as a result of authentication processing of S10, the PHS terminal which was able to take the authentication check is memorized (S(overwrite is possible) 12), and the number N of authentication checks (however, several authentication checks in S1 N initial value 0) is incremented one time (S13). It progresses after [S14] processing of S13, and the comparison of the authentication number of processing m and a several n arrival-of-the-mail response is performed.

[0012] It judges that the mobile communication terminal which has not carried out authentication processing yet will remain in others if m is smaller than n as a result of the comparison of the authentication number of processing m of S14, and several n arrival-of-the-mail response reception, the authentication number of processing m is incremented one time, and it returns to S(S15) 10. In S14, if the value of m and n is in agreement, it will judge that there is no arrival-of-the-mail response which should be carried out authentication processing to others, and a set (S17) and the number N of authentication checks will check reset (S16) and the authentication number of processing m for several n arrival-of-the-mail response reception in 0 to 1 of initial value (S18). In S18, when the number N of authentication checks is 0, cutting processing is performed to the arrival-of-the-mail response of all these arrival-of-the-mail demands and reception beams (S19), and it returns to S1. Moreover, in S18, when the number N of authentication checks is not 0, it checks whether next N is 1 (S20).

[0013] In S20, since there is no authentication check in two or more terminals when the number N of authentication checks is 1, connection processing of the PHS terminal memorized by S12 is started (S21). Moreover, since it is judged that the authentication

check was carried out in two or more terminals when the number N of authentication checks is not 1 in S20, the terminal number which was able to take the authentication check and which is used improperly is memorized (S22), cutting processing is carried out to the arrival-of-the-mail demand which the system has received, and all arrival-of-the-mail responses (S23), and it returns to S1. In addition, although it is to return after [S1] cutting processing to an arrival-of-the-mail demand when a several n arrival-of-the-mail response is 0 in S8 in the above-mentioned arrival-of-the-mail method, as for a network, an arrival-of-the-mail demand is transmitted again in fact. Here, in order to make a flow chart intelligible, arrival-of-the-mail demand resending is not described.

[0014] In invention of claim 2, claim 3, claim 4, claim 7, claim 8, claim 9, claim 12, claim 13, and claim 14, the sending and receiving and new location registration of a terminal number which were memorized by S21 of the above-mentioned flow chart are regulated. Moreover, in invention of claim 5, claim 10, and claim 15, a management service engine is notified of the terminal number memorized by S21 of the above-mentioned flow chart, and the positional information of the terminal which has this terminal number.

[0015] In explanation of the gestalt of this operation, although explained by making public PHS service into the example of representation, this invention is applicable to all mobile communication system including the digital cordless system for places of business which it calls [system] all at once and operates two or more authentication processings to an arrival-of-the-mail demand in area. especially present digital one -- in a cellular system The communications area (cel) which one base station covers compares with PHS. Since it is comparatively large, as [perform / all at once / to two or more base stations (base station group) / arrival-of-the-mail demands], although it calls all at once and does not have area since the communications area (cel) is moved in the direction which becomes still smaller from now on, it may call all at once like PHS in the future and area may be installed -- this invention -- mobile communication service at large -- broad application can be considered.

[0016]

[Effect of the Invention] This invention has the following effectiveness so that clearly from the above explanation.

(1) By the mobile communications arrival method of claims 1, 6, and 11, mobile communication system becomes possible [checking the existence at the time of the

unjust terminal arrival which became a just mobile communication terminal and was cleared up].

(2) Discover existence of the unjust terminal which mobile communication system became a just mobile communication terminal, and was cleared up by the mobile communications arrival method of claims 2, 7, and 12 at an early stage, and it becomes possible to prevent tapping by the unjust terminal beforehand by refusing the arrival-of-the-mail demand to the terminal number which an unjust terminal uses.

(3) Discover existence of the unjust terminal which mobile communication system became a just mobile communication terminal, and was cleared up by the mobile communications arrival method of claims 3, 8, and 13 at an early stage, and it becomes possible to prevent unjust accounting by unjust terminal use beforehand by refusing the dispatch demand from the terminal number which an unjust terminal uses.

(4) Discover existence of the unjust terminal which mobile communication system became a just mobile communication terminal, and was cleared up by the mobile communications arrival method of claims 4, 9, and 14 at an early stage, and it becomes possible to prevent use of an unjust terminal beforehand by refusing the renewal of positional information from a mobile communication terminal which has the terminal number which an unjust terminal uses.

(5) Mobile communication system discovers existence of the unjust terminal which became a just mobile communication terminal and was cleared up, and the early original correspondence of it is attained for every mobile service to unjust terminal use by the mobile communications arrival method of claims 5, 10, and 15 by notifying existence of an unjust terminal to a management service engine in charge automatically.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is a flow chart for explaining the mobile communications arrival method concerning this invention indicated to claims 1, 6, and 11.

[Drawing 2] It is a flow chart explaining the mobile communications arrival method in public PHS service.

[Drawing 3] It is a flow chart explaining arrival-of-the-mail response two or more permission method.

【特許請求の範囲】

【請求項1】 移動体通信端末装置の認証機能を有する移動体通信システムで、一斉呼出しエリア内に存在する複数の基地局に対して一斉に着信要求を行い、一斉呼出しエリアに収容される複数の移動体通信基地局からの着信応答受信を一定時間（システム設定の着信応答受付時間）内許容し、着信応答のあった複数の移動体通信端末装置との間の認証手順により正当端末を確認した後に、着信接続すべき対象基地局を決定する移動体通信着信方式において、

上記移動体通信システムの任意の一斉呼出しエリアに対し着信要求が発生し、一定時間内にその要求に対して複数の移動体通信端末装置から着信応答があった場合には、応答を受けた全ての着信応答に対して認証処理を実行することにより、不正入手した認証鍵を使用する不正端末の利用を確認可能とすることを特徴とする移動体通信着信方式。

【請求項2】 移動体通信システムの任意の一斉呼出しエリアに対し着信要求が発生し、一定時間内にその要求に対して複数の移動体通信端末装置から着信応答があり、それぞれの着信応答に対する認証手順において複数の端末の認証が確認された場合には、前記移動体通信システムは認証確認された移動体通信端末装置の端末番号を記憶し、以後該端末番号宛の着信を拒否することによりその不正使用を防止することを特徴とする請求項1記載の移動体通信着信方式。

【請求項3】 移動体通信システムの任意の一斉呼出しエリアに対し着信要求が発生し、一定時間内にその要求に対して複数の移動体通信端末装置から着信応答があり、それぞれの着信応答に対する認証手順において複数の端末の認証が確認された場合には、移動体通信システムは認証確認された移動体通信端末装置の端末番号を記憶し、以後該端末番号を有する移動体通信端末装置からの発信を拒否することによりその不正使用を防止することを特徴とする請求項1記載の移動体通信着信方式。

【請求項4】 移動体通信システムの任意の一斉呼出しエリアに対し着信要求が発生し、一定時間内にその要求に対して複数の移動体通信端末装置から着信応答があり、それぞれの着信応答に対する認証手順において複数の端末の認証が確認された場合には、移動体通信システムは認証確認された移動体通信端末装置の端末番号を記憶し、以後該端末番号を有する移動体通信端末装置が他の通信エリアにおいて位置情報を更新することを拒否することにより、その不正使用を防止することを特徴とする移動体通信着信方式。

【請求項5】 移動体通信システムの任意の一斉呼出しエリアに対し着信要求が発生し、一定時間内にその要求に対して複数の移動体通信端末装置から着信応答があり、それぞれの着信応答に対する認証手順において複数の端末の認証が確認された場合には、移動体通信システム

は認証確認された移動体通信端末装置の端末番号が不正利用されていると判断し、該移動体通信端末装置の端末番号と位置情報を所轄の管理サービス機関等に自動的に通知することを特徴とする請求項1記載の移動体通信着信方式。

【請求項6】 複数のPHS(Personal Handy-phone System)基地局を収容する公衆デジタル網で、一斉呼出しエリア内に存在する複数の公衆用基地局に対して一斉にPHS端末に対する着信要求を行い、一斉呼出しエリアに収容される複数の公衆用基地局からの着信応答受信を一定時間（システム設定の着信応答受付時間）内許容し、複数のPHS端末との間の認証手順により正当端末を確認した後に、着信接続すべき対象公衆用基地局を決定する移動体通信着信方式において、

上記公衆PHSサービスにおける任意の一斉呼出しエリアに対し着信要求が発生し、一定時間内にその要求に対して複数のPHS端末から着信応答があった場合には、応答を受けた全ての着信応答に対して認証処理を実行することにより、不正入手した認証鍵を使用する不正端末の利用を確認可能とすることを特徴とする移動体通信着信方式。

【請求項7】 公衆PHSサービスにおける任意の一斉呼出しエリアに対し着信要求が発生し、一定時間内にその要求に対して複数のPHS端末から着信応答があり、それぞれの着信応答に対する認証手順において複数のPHS端末の認証が確認された場合には、PHS端末の位置情報等を管理する公衆デジタル網は該PHS端末の端末番号を記憶し、以後該端末番号宛の着信を拒否することによりその不正使用を防止することを特徴とする請求項6記載の移動体通信着信方式。

【請求項8】 公衆PHSサービスにおける任意の一斉呼出しエリアに対し着信要求が発生し、一定時間内にその要求に対して複数のPHS端末から着信応答があり、それぞれの着信応答に対する認証手順において複数のPHS端末の認証が確認された場合には、PHS端末の位置情報等を管理する公衆デジタル網は該PHS端末の端末番号を記憶し、以後該端末番号からの発信を拒否することによりその不正使用を防止することを特徴とする請求項6記載の移動体通信着信方式。

【請求項9】 公衆PHSサービスにおける任意の一斉呼出しエリアに対し着信要求が発生し、一定時間内にその要求に対して複数のPHS端末から着信応答があり、それぞれの着信応答に対する認証手順において複数のPHS端末の認証が確認された場合には、PHS端末の位置情報等を管理する公衆デジタル網は該PHS端末の端末番号を記憶し、該PHS端末が他の通信エリアにおいて位置情報を更新することを拒否することによりその不正使用を防止することを特徴とする請求項6記載の移動体通信着信方式。

【請求項10】 公衆PHSサービスにおける任意の一

斉呼出しエリアに対し着信要求が発生し、一定時間内にその要求に対して複数のPHS端末から着信応答があり、それぞれの着信応答に対する認証手順において複数のPHS端末の認証が確認された場合には、PHS端末の位置情報等を管理する公衆デジタル網は該PHS端末の端末番号が不正利用されていると判断し、該PHS端末の端末番号と位置情報を所轄の管理サービス機関等に自動的に通知することを特徴とする請求項6記載の移動体通信着信方式。

【請求項11】 複数のデジタルコードレス基地局及び移動局とそれを収容するPBXとから構成され、移動局の認証機能を有する事業所用デジタルコードレスシステムで、一斉呼出しエリア内に存在する複数の基地局に対して一斉に移動局に対する着信要求を行い、一斉呼出しエリアに収容される複数の基地局からの着信応答受信を一定時間（システム設定の着信応答受付時間）内許容し、複数の移動局との間の認証手順により正当端末を確認した後に、着信接続すべき対象基地局を決定する移動体通信着信方式において、
上記事業所用デジタルコードレスシステムにおける任意の一斉呼出しエリアに対し着信要求が発生し、一定時間内にその要求に対して複数の移動局から着信応答があった場合には、応答を受けた全ての着信応答に対して認証処理を実行することにより、不正入手した認証鍵を使用する不正端末の利用を確認可能とすることを特徴とする移動体通信着信方式。

【請求項12】 事業所用デジタルコードレスシステムにおける任意の一斉呼出しエリアに対し着信要求が発生し、一定時間内にその要求に対して複数の移動局から着信応答があり、それぞれの着信応答に対する認証手順において複数移動局の認証が確認された場合には、事業所デジタルコードレスシステムは該移動局の端末番号を記憶し、以後該端末番号宛の着信を拒否することによりその不正使用を防止することを特徴とする請求項11記載の移動体通信着信方式。

【請求項13】 事業所用デジタルコードレスシステムにおける任意の一斉呼出しエリアに対し着信要求が発生し、一定時間内にその要求に対して複数の移動局から着信応答があり、それぞれの着信応答に対する認証手順において複数移動局の認証が確認された場合には、事業所デジタルコードレスシステムは該移動局の端末番号を記憶し、以後該端末番号を有する移動局からの発信を拒否することによりその不正使用を防止することを特徴とする請求項11記載の移動体通信着信方式。

【請求項14】 事業所用デジタルコードレスシステムにおける任意の一斉呼出しエリアに対し着信要求が発生し、一定時間内にその要求に対して複数の移動局から着信応答があり、それぞれの着信応答に対する認証手順において複数移動局の認証が確認された場合には、事業所デジタルコードレスシステムは該移動局の端末番号

を記憶し、該移動局が他の通信エリアにおいて位置情報を更新することを拒否することによりその不正使用を防止することを特徴とする請求項11記載の移動体通信着信方式。

【請求項15】 事業所用デジタルコードレスシステムにおける任意の一斉呼出しエリアに対し着信要求が発生し、一定時間内にその要求に対して複数の移動局から着信応答があり、それぞれの着信応答に対する認証手順において複数移動局の認証が確認された場合には、事業所デジタルコードレスシステムは該移動局の端末番号が不正利用されていると判断し、該移動局の端末番号と位置情報をシステム管理者等に自動的に通知することを特徴とする請求項11記載の移動体通信着信方式。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、移動体通信着信方式に関し、より詳細には複数の移動体通信基地局群（一斉呼出しエリア）に対し一斉に着信要求を行う移動体通信網において、一斉呼出しエリアに対する一つの着信要求に対して、ある一定時間内に受信する複数の移動体通信基地局からの着信応答を許容する移動体通信着信方式に関する。

【0002】

【従来の技術】現在サービス中の公衆PHSサービスにおいては、PHS端末への着信時、網内に予め登録されているPHS端末の位置情報に基づき、網は複数の基地局（基地局群）、すなわち一斉呼出しエリアに対し、一斉に着信要求を行う。網は一番早く着信応答を受信した基地局を着信接続の対象基地局として選択し、その基地局配下にあるPHS端末とのみ認証処理を行う。そのため、最初に着信応答したPHS端末が、何らかの手段により本来着信すべき他のPHS端末の認証鍵を不正入手し、他のPHS端末になりすましていた不正PHS端末であった場合には、認証処理において不正PHS端末が正当な端末であると誤認されてしまう。

【0003】上記の通信着信方式を図2に示すフローチャートにより説明する。まず、一斉呼出しエリアが無通話状態（ステップS101・・・以下、ステップという表現を省略して単にSと表記する）において、この一斉呼出しエリア内に位置登録されるPHS端末に対する着信要求が発生すると（S102）、網は一斉呼出しエリア内に存在する全ての公衆用基地局に着信要求を送信する（S103）。網はこの着信要求に対する着信応答を受信すると（S104）、着信応答を受信したPHS端末との間で認証処理を行う（S105）。S105の認証処理の結果、前記PHS端末の認証確認がとれなかった場合には、該PHS端末装置に対して切断処理を行い（S106）、さらにこの着信要求に対して切断処理を行って（S107）S101に戻る。また、S105の認証処理の結果、前記PHS端末に対して認証確認され

た場合には、この時点で着信応答を受信している段階にある全てのリンクに対して切断処理を行い（S108）、認証が確認された前記PHS端末との間で接続処理を行う（S109）。

【0004】このような着信方式によると、一斉呼出しエリアに正当端末と、その認証鍵を不正入手して正当端末になりすました不正端末の両方が存在し、不正端末が正当端末よりも早く着信応答を行った場合、認証処理は不正端末との間でしか行われず、網では不正端末の存在を確認できない。また、現在サービス中の公衆PHSサービスの着信方式とは別に、一斉呼出しエリアに対する着信要求に対して、一斉呼出しエリア内の複数の移動単10に通信基地局からの着信応答の信号受信を一定時間許容し、複数の移動単に通信端末装置との間で認証処理を行い、認証を確認した後に着信接続すべき対象基地局を決定する着信応答複数許容方式が、正しい認証鍵を持たない不正端末による通信妨害防止の目的で考えられている。前記着信応答複数許容方式を移動体通信システムに採用することにより、移動体通信システムにおいては、不正端末使用による正規端末の通信妨害を防止することが可能となる。20

【0005】上記の着信応答複数許容方式を公衆PHSサービスに適用した例を図3に示し、以下にこれを説明する。まず、一斉呼出しエリアが無通話状態（S111）において、この一斉呼出しエリア内に位置登録されるPHS端末に対する着信要求が発生すると（S112）、網は一斉呼出しエリア内に存在する全ての公衆用基地局に着信要求を送信し（S113）、着信応答受付時間を計測するためのタイマTを起動する（S114）。網はタイマT起動中にこの着信要求に対する着信20応答を受信すると（S116）、着信応答受信数nを1インクリメントし、nと着信応答のあった基地局とを関連づけて記憶し（S117）（ただし、S111における着信応答受信数nの初期値は0）、S115で次の着信応答受信を待つ。S115でタイマTが満了すると、着信応答の受付を終了し受信した着信応答の認証処理に入る。まず着信応答受信があったかどうか、すなわち着信応答受信数nが0でないかどうかの確認を行う（S118）。S118において着信応答受信がなく、nが0であった場合にはこの着信要求に対して切断処理を行い40（S119）S1に戻る。

【0006】また、S118において着信応答受信が認められ、着信応答受信数nが0以外の値であった場合には、認証処理数m（ただし、S111における認証処理数mの初期値は1）の値を関連づけられた基地局配下のPHS端末に対する認証処理を行う（S120）。S120の認証処理の結果、前記PHS端末の認証確認がとれなかった場合には、該PHS端末に対して切断処理を行う（S121）。その後、認証処理数mと着信応答受信数nの比較を行い（S122）、mとnの値が一致す50

れば他に認証処理すべき着信応答がないと判断し、着信応答受信数nをリセット（S123）、また認証処理数mを初期値の1にして（S124）、この着信要求に対して切断処理を行い（S119）S111に戻る。S122での認証処理数mと着信応答受信数nの比較の結果、mがnよりも小さければ、まだ認証処理をしていないPHS端末が他に残っていると判断し、認証処理数mを1インクリメントして（S125）S120に戻る。また、S120の認証処理の結果、前記PHS端末に対して認証確認された場合には、この時点で着信応答を受信している段階にある全てのリンクに対して切断処理を行い（S126）、着信応答受信数nリセット（S127）、認証処理数mを初期値の1にセット（S128）してから、認証が確認された前記PHS端末との間で接続処理を行う（S129）。

【0007】なお、上記の着信方式においてS118において着信応答数nが0であった場合は着信要求に対して切断処理後S111に戻るになっているが、実際には網は再度着信要求の送信を行う。ここでは、フローチャートをわかりやすくするために、着信要求再送については記述していない。上記の着信方式においても、不正入手した認証鍵を使用する移動体通信端末装置の存在を発見することはできない。

【0008】

【発明が解決しようとする課題】上記のように、現在サービス中の公衆PHSサービスは、一つの着信に対する応答を一つしか許容しないため、正規端末から認証鍵を不正入手した不正端末の着信を検出できない。また、一斉呼出しエリアに対する一つの着信要求に対し、一斉呼出しエリア内に存在する複数基地局からの着信応答受信を許容し、着信応答のあった複数の移動体通信端末装置との間の認証手順で、移動体通信端末装置の認証を確認した後に、着信接続すべき対象基地局を決定する着信応答複数許容方式を採用する移動体通信システムにおいても、一定時間内に受信した着信応答に対応する移動体通信端末装置との間の認証処理を順次行い、認証が確認されるとその時点で他の全てのリンクを解放し、認証確認のとれた端末に対して接続処理を行うため、やはり正規端末から認証鍵を不正入手した不正端末の着信を検出できない。本発明は、上記の点に鑑みてなしたものである。本発明は、上記の点に鑑みてなしたものであり、認証鍵を不正入手した不正移動体通信端末装置の存在を早期に発見し、その使用を未然に防止することが可能な移動体通信着信方式を提供することを目的とするものである。

【0009】

【課題を解決するための手段】上述の課題を解決するために、公衆PHSサービス、事業所用デジタルコードレスシステム等の移動体通信システムにおいて、本発明の移動体通信着信方式では、移動体通信システムは一定時間内に受信した全ての着信応答に対して認証処理を行

う手段を有する。また、本発明の移動体通信着信方式適用の移動体通信システムでは、さらに複数の端末において同時に認証が確認された場合には、その端末番号を記憶する手段、または、その端末番号及び位置情報等を管理サービス機関等に通知する手段、または、記憶された端末番号宛への着信を拒否する手段、または、記憶された端末番号を有する端末からの発信や位置登録を拒否する手段等を有する。本発明の移動体通信着信方式適用の移動体通信システムは、一つの着信要求に対して、一定時間内に受信する複数の基地局からの着信応答の受信を許容する。該移動体通信システムは、一定時間内に受信した着信応答全てに対し認証処理を行うことにより、複数の端末に対して認証が確認された場合には、認証鍵を不正入手しそれを利用しようとする端末の存在を確認することが可能となる。また、一つの着信に対して複数の

【0010】

【発明の実施の形態】以下に、本発明の移動体通信着信方式について説明する。図1は、請求項1、請求項6及び請求項11記載の移動体通信着信方式適用した移動体通信システムの動作を説明するためのフローチャートである。以下の説明においては、公衆PHSサービスによる移動通信方式を代表例として、一つの斉呼出しエリアでの着信方式について説明する。まず、斉呼出しエリアが無通話状態（S1）において、この斉呼出しエリア内に位置登録されるPHS端末に対する着信要求が発生すると（S2）、網は斉呼出しエリア内に存在する全ての公衆用基地局に着信要求を送信し（S3）、着信応答受付時間を計測するためのタイマTを起動する（S4）。網はタイマT起動中にこの着信要求に対する着信応答を受信すると（S6）、着信応答受信数nを1インクリメントし、nと着信応答のあった基地局とを関連づけて記憶し（S7）（ただし、S1における着信応答受信数nの初期値は0）、S5で次の着信応答を受信を待つ。

【0011】S5でタイマTが満了すると、着信応答の受付を終了し受信した着信応答の認証処理に入る。まず、着信応答受信があったかどうか、すなわち、着信応答受信数nが0でないかどうかの確認を行う（S8）。S8において着信応答受信がなく、nが0であった場合にはこの着信要求に対して切断処理を行い（S9）S1

に戻る。また、S8において着信応答受信が認められ、着信応答受信数nが0以外の値であった場合には、認証処理数m（ただし、S1における認証処理数mの初期値は1）の値を関連づけられた基地局配下のPHS端末に対する認証処理を行う（S10）。S10の認証処理の結果、前記PHS端末の認証確認がとれなかった場合には、該PHS端末に対して切断処理を行う（S11）。その後、認証処理数mと着信応答受信数nの比較を行う（S14）。また、S10の認証処理の結果、前記PHS端末に対して認証確認された場合には、認証確認のとれたPHS端末を記憶し（上書き可）（S12）、認証確認数N（ただし、S1における認証確認数Nの初期値は0）を1インクリメントする（S13）。S13の処理の後S14に進み、認証処理数mと着信応答数nの比較を行う。

【0012】S14での認証処理数mと着信応答受信数nの比較の結果、mがnよりも小さければ、まだ認証処理をしていない移動体通信端末装置が他に残っていると判断し、認証処理数mを1インクリメントして（S15）S10に戻る。S14において、mとnの値が一致すれば他に認証処理すべき着信応答がないと判断し、着信応答受信数nをリセット（S16）、また認証処理数mを初期値の1にセット（S17）、認証確認数Nが0か確認する（S18）。S18において、認証確認数Nが0であった場合には、この着信要求と受付けた全ての着信応答に対して切断処理を行い（S19）S1に戻る。またS18において、認証確認数Nが0ではなかった場合には、次にNが1であるかどうか確認する（S20）。

【0013】S20において、認証確認数Nが1であった場合には、複数端末における認証確認がないため、S12で記憶されたPHS端末の接続処理に入る（S21）。またS20において認証確認数Nが1ではなかった場合、複数端末において認証確認されたと判断されるため、認証確認がとれた不正使用されている端末番号を記憶し（S22）、システムが受信している着信要求と全ての着信応答に対して切断処理を行い（S23）S1に戻る。なお、上記の着信方式においてS8において着信応答数nが0であった場合は着信要求に対して切断処理後S1に戻ることにしているが、実際には網は再度着信要求の送信を行う。ここでは、フローチャートをわかりやすくするために、着信要求再送については記述していない。

【0014】請求項2、請求項3、請求項4、請求項7、請求項8、請求項9、請求項12、請求項13及び請求項14の発明では、上記フローチャートのS21で記憶した端末番号の発着信及び新規位置登録を規制する。また、請求項5、請求項10及び請求項15の発明では、上記フローチャートのS21で記憶した端末番号と、該端末番号を有する端末の位置情報とを管理サービ

ス機関に通知する。

【0015】本実施の形態の説明においては、公衆PHSサービスを代表例として説明を行ったが、本発明は一斉呼出しエリアへの着信要求に対して複数の認証処理を動作させる事業所用デジタルコードレスシステムを始めとする、あらゆる移動体通信システムに対して適用可能である。特に、現行のデジタルセルラーのシステムでは、一つの基地局がカバーする通信エリア（セル）がPHSと比べて比較的広いため、複数の基地局（基地局群）に対して一斉に着信要求を行うような一斉呼出しエリアを有していないが、今後通信エリア（セル）はさらに小さくなる方向に動いており、将来的にはPHS同様一斉呼出しエリアを設置する可能性もあるため、本発明は移動体通信サービス全般幅広い適用が考えられる。

【0016】

【発明の効果】本発明は、以上の説明から明らかなように、以下の効果がある。

（１）請求項１、６及び１１の移動体通信着信方式では、移動体通信システムは正当な移動体通信端末装置になりすました不正端末着信時に、その存在を確認することが可能となる。

（２）請求項２、７及び１２の移動体通信着信方式では、移動体通信システムは正当な移動体通信端末装置になりすました不正端末の存在を早期に発見し、不正端末が使用する端末番号への着信要求を拒否することにより、不正端末による盗聴を未然に防止することが可能となる。

（３）請求項３、８及び１３の移動体通信着信方式では、移動体通信システムは正当な移動体通信端末装置になりすました不正端末の存在を早期に発見し、不正端末が使用する端末番号からの発信要求を拒否することにより、不正端末使用による不当な課金を未然に防止することが可能となる。

（４）請求項４、９及び１４の移動体通信着信方式では、移動体通信システムは正当な移動体通信端末装置になりすました不正端末の存在を早期に発見し、不正端末が使用する端末番号を有する移動体通信端末装置からの位置情報更新を拒否することにより、不正端末の使用を未然に防止することが可能となる。

（５）請求項５、１０及び１５の移動体通信着信方式では、移動体通信システムは正当な移動体通信端末装置になりすました不正端末の存在を発見し、不正端末の存在を自動的に所轄の管理サービス機関に通報することにより、不正端末使用に対し移動通信サービス毎に早期独自対応が可能となる。

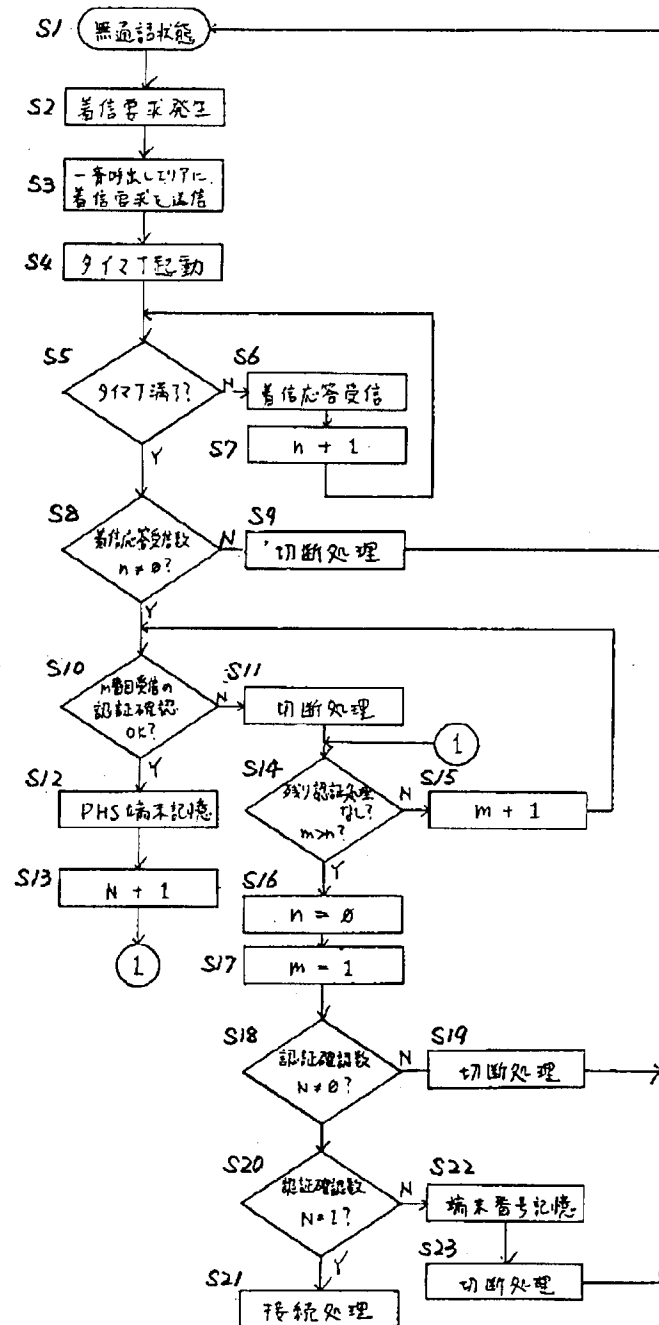
【図面の簡単な説明】

【図１】請求項１、６及び１１に記載した本発明に係る移動体通信着信方式を説明するためのフローチャートである。

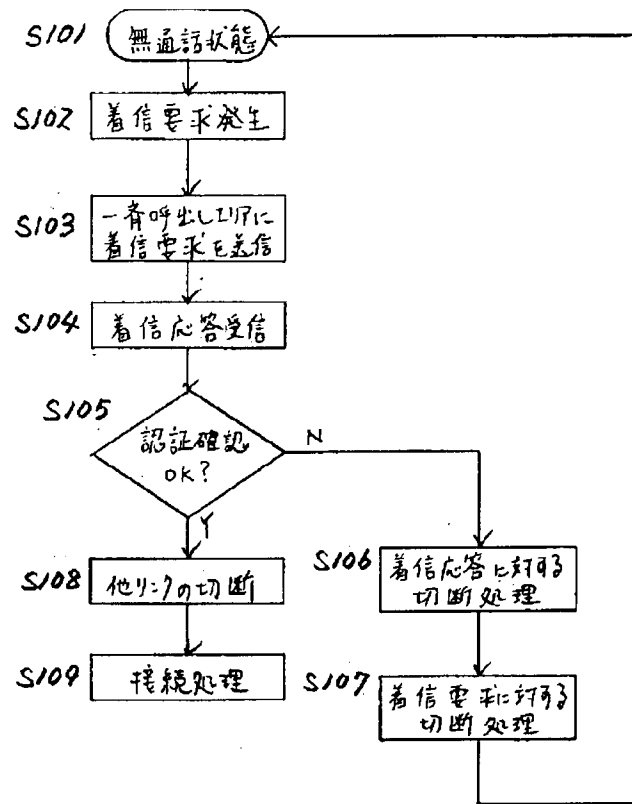
【図２】公衆PHSサービスにおける移動体通信着信方式を説明するフローチャートである。

【図３】着信応答複数許容方式を説明するフローチャートである。

【図1】



【図2】



【図3】

